REMARKS

The preceding amendments and following remarks form a full and complete response to the Office Action dated January 9, 2009. Claim 1, 10 and 17 have been amended, but no new matter has been added. Claims 2-6 have been cancelled without prejudice or disclaimer. Claims 18-38 were previously withdrawn from consideration without prejudice or disclaimer. Support for the amendments to claims 1, 10 and 17 can be found, *inter alia*, in the Specification at pages 22-24 and in original claim 2. Accordingly, Applicants submit claims 1 and 7-40 for consideration.

Objection to the Specification

The Examiner objected to the Specification because it purportedly contains an embedded hyperlink and/or other form of browser-executable code. In particular, the Examiner alleges that pages 24 and 31 of the specification contain browser-executable code. Applicants can find no portion of the specification containing browser-executable code and respectfully request that the Examiner either more clearly identify the contents of the application viewed as browser-executable code, or withdraw the objection to the Specification.

Claim Rejections under 35 U.S.C. § 102

The Examiner rejected claims 1, 3-4, 7-9, 14-17, and 39-40 under 35 U.S.C. § 102(e) as anticipated by U.S. patent Application Publication No. 2002/0124108 by Terrell et al. ("Terrell"). Applicants traverse the rejection on the basis that Terrell fails to disclose each and every feature of claims 1, 3-4, 7-9, 14-17, and 39-40.

Terrell relates to a system for secure data communication in which an application may use a virtual interface (VI) channel by registering the virtual addresses in host memory in which the data for communication is stored or will be accepted into. Each application may password-protect its channel. Only the application which registered the virtual addresses for the channel can use the channel and only if the password supplied by the application matches that stored at the network interface device. The Terrell system is thus concerned with ensuring the security of communications channels over a network.

Applicant respectfully submits that Terrell does not disclose all of the features of claim 1. For instance, Terrell does not disclose two queues associated with a logical data port, the first

queue being located in the address space of the application with which the port is associated for receiving data directed to that logical data port, and the second queue being located in the address space of the operating system for receiving out-of-band data directed to the operating system for that logical data port, as recited in claim 1. In Terrell, the queues of a VI channel are located only in the address space of the application with which the channel is associated (see the XMT and RCV work queues of figures 4D and 4E, respectively, and paragraphs 94 to 97). That is, Terrell does not describe the operating system supporting queues for a particular logical data port (or VI channel). The operating system is only described as having a command queue (paragraph 69) for the commands performed by the operating system (which may include commands performed on one or more VI channels). Accordingly, because Terrell does not disclose "apply[ing] to a second queue located in the address space of the operating system out-of-band data received over the link for the particular logical data port …," as recited in claim 1, Terrell does not anticipate claim 1.

Claim 1 is also patentable over Terrell for the separate and independent reason that Terrell fails to disclose "apply[ing] to a second queue located in the address space of the operating system out-of-band data received over the link for the particular logical data port and identified as being directed to the operating system, the second queue being memory mapped into the address space of the user application," as required by claim 1 (emphasis added).

In Terrell, VI channels are established by the operating system and can support communications of one or more protocols between two applications on different host computer systems. In order to support such a system, it is implicit in Terrell that there are two types of out-of-band data associated with a VI channel and the data it carries: (1) the out-of-band data associated with the establishment and configuration of a VI channel and (2) the out-of-band data associated with maintaining communications of a given protocol over the VI channel. Of these two types, only the data associated with the establishment and configuration of a VI channel is directed to the operating system because the operating system is not involved in the protocol-level maintenance of communications over a VI channel. With respect to VI channels, the functions performed by the operating system are listed at paragraph 64, and paragraphs 70 to 88 along with figures 4A to 4E describe these functions in more detail.

In Terrell, it is the applications themselves which handle the out-of-band data associated with the particular protocol by which data is being transmitted or received (paragraph 63). This is further evidenced at paragraph 135, which relates to the multiprotocol embodiment of Terrell and describes the application handling SCSI commands and their associated status and error responses. The operating system is not involved with maintaining communications at this level. Equally, an application is not involved in establishing a VI channel. It is clear from paragraphs 82 and 83 that each application can only access its own VI channel by means of the interfaces provided by the operating system, and not by means of the register I/O or command queue to which only the operating system has access.

For example, paragraph 68 explains that communication between the OS and application is preferably accomplished by system calls, as shown in figures 4A to 4E, with only the operating system having access to the register I/O and command queue by which communication with the network interface device is achieved. An application has no involvement with establishing a VI channel (other than requesting the creation of the channel by means of a system call and providing certain identifiers such as passwords) and therefore cannot have any access to any out-of-band data held by the operating system relating to the creation and maintenance of the VI channel. Only the operating system has the necessary privilege level to assign memory for use by the channel and provide instructions to the network interface device (paragraph 82). Allowing an untrusted application access to the command queues of the operating system would break this security model.

It therefore follows that in the Terrell system, out-of-band data supported at the operating system (i.e. data in the command queues relating to the establishment and maintenance of the VI channels) cannot be memory-mapped into the address space of a user application. Such data is directed to the operating system, not an application, and is secure from any access by any user level application. Claim 1 is therefore novel over Terrell for the additional reason that Terrell does not disclose "apply[ing] to a second queue located in the address space of the operating system out-of-band data received over the link for the particular logical data port and identified as being directed to the operating system, the second queue being memory mapped into the address space of the user application," as required by claim 1 (emphasis added).

Applicants respectfully request the withdrawal of the rejection of claim 1 (and the claims that depend from claim 1).

CONCLUSION

In view of the above, all rejections have been sufficiently addressed. The Applicant submits that the application is now in condition for allowance and requests that the Office pass the application to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event that this paper is not timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account No. 02-2135.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

Respectfully submitted,

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